Energy Efficiency and Evaluation, Measurement and Verification (EM&V)

February 22, 2016

Supreme Court Stays the Clean Power Plan

- On February 9, 2016, the Supreme Court stayed implementation and enforcement of the Clean Power Plan pending judicial review. The Court's decision was not on the merits of the rule.
- EPA firmly believes the Clean Power Plan will be upheld when the merits are considered because the rule rests on strong scientific and legal foundations.
- For the states that choose to continue to work to cut carbon pollution from power plants and seek the agency's guidance and assistance, EPA will continue to provide tools and support.
- EPA will make additional information available as necessary.

Key Points

- Implementation and enforcement are on hold.
- Initial submittals not required on September 6, 2016.
- EPA will continue to work with states that want to work with us on a voluntary basis.

Measures to Lower CO_2 Under the Clean Power Plan

Measures include but are not limited to:

- Heat rate improvements
- Fuel switching to a lower carbon content fuel
- Carbon capture and utilization for existing sources
- Carbon capture and sequestration for existing sources
- Integration of renewable energy into EGU operations
- Combined heat and power
- Qualified biomass co-firing and repowering
- Renewable energy (new & capacity uprates)
  - Wind, solar, hydro, waste-to-energy, wave and tidal power
- Nuclear generation (new & capacity uprates)
- Demand-side Energy Efficiency programs and policies

Today's Focus

- Demand-side management measures
- Electricity transmission and distribution improvements (e.g. conservation voltage reduction)
- Others

The final CPP is available at 80 FR 64661. In the event of any conflict between the provisions of the final rule and these slides, the final rule and requirements within are controlling.

The Clean Power Plan Provides Many Opportunities for Energy Efficiency

- The Clean Power Plan (CPP) puts energy efficiency (EE) front and center as a compliance option that avoids or reduces carbon dioxide (CO_2) from affected electric generating units (EGUs) and can help states meet their CPP goal for affected EGUs.

- It is an important, proven strategy widely used by states that can substantially and cost-effectively lower CO_2 emissions from the power sector across all state plan pathways.

- Final state goals don't include EE as a Best System of Emission Reduction (BSER) building block, this does not limit the ability of states to use EE to meet their CPP goals for affected EGUs.

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Demand-side Energy Efficiency in the CPP

- "DS-EE refers to an extensive array of technologies, practices and measures that are applied throughout all sectors of the economy to reduce energy demand while providing the same, and sometimes better, level and quality of service." *(from DS-EE TSD)*
- Demand-side EE policies, programs and measures called out in the CPP include, but are not limited to:
  - Utility/nonutility energy efficiency programs
  - Building energy codes
  - Energy savings performance contracting
  - State appliance and equipment standards
  - Behavioral and industrial programs
  - Energy efficiency in water and wastewater facilities
- These policies, programs and measures can be used under any of the state plan pathways.

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Two State Plans Designs

States are able to choose one of two state plan types:

Emission Standards Plan – state places federally enforceable emission standards on affected EGUs that fully meet the emission guidelines

- can be designed to meet the CO_2 emission performance rates or state goal (rate-based or mass-based goal)

State Measures Plan - state includes, at least in part, measures implemented by the state that are not included as federally enforceable emission standards

- designed to achieve the state CO_2 mass-based goal
- includes federally enforceable measures as a backstop

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How Does EE fit in the State Plans?

Type of Approach		Role of EE in State Plan	How states can advance EE
Emission Standards	Mass	***EE reduces cost, EE lowers CO_2 emissions but is not federally enforceable or written into the state plan***	• Allocate CO_2 allowances for EE (e.g. through a set-aside) • Auction allowances, use $ for EE • Secure matching allowances for low-income EE from Clean Energy Incentive Program (CEIP)
	Rate	***EE is explicitly written into state plan; Used to generate Emission Rate Credits (ERCs) and directly adjust reported CO_2 emissions rate of affected EGUs***	• Include EE ERC tracking, trading, and issuance provisions in the state plan • Issue ERCs for quantified and verified MWh savings from eligible EE measures • Secure matching ERCs from CEIP for low-income EE
State Measures	State Demonstration Based on Mass	***Explicitly included as supporting material for state plan – enforceable under state law; State EE policies and measures can be used to help affected EGUs meet mass goal***	• Implement state EE policies and programs (e.g., EERS, building codes) that are enforceable under state law, either to meet goal or in conjunction with federally enforceable limits • Secure matching allowances from CEIP for low-income EE

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Mass-based emission standards approach

Type of Approach	Role of EE in State Plan	How states can advance EE
Emission Standards → Mass	***EE reduces cost, EE lowers CO_2 emissions but is not enforceable or written into the state plan***	• Allocate CO_2 allowances for EE (e.g. through a set aside) • Auction allowances, use $ for EE • Secure matching allowances for low- income EE from Clean Energy Incentive Program (CEIP)

- Any EE measure achieving savings during the plan performance period, regardless of when it was installed, automatically "counts".
  - It displaces fossil generation and helps meet the CO_2 emission cap.
  - Stack CO_2 emissions are the key criteria for showing that state goals for affected EGUs have been met.

- States have many opportunities to advance EE as a complement to their state plan, through allowance allocation as part of a state plan, and can get matching allowances from EPA through the Clean Energy Incentive Program.

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Rate-based emission standards approach

Type of Approach	Role of EE in State Plan	How states can advance EE
Emission Standards → Rate	***Explicitly written into state plan; Used to generate ERCs and directly adjust reported CO_2 emissions rate of affected EGUs***	• Include EE ERC tracking, trading, and issuance provisions in the state plan • Issue ERCs for quantified and verified MWh savings from eligible EE measures • Secure matching ERCs from CEIP low-income EE

- Quantified and verified MWhs from eligible EE during the plan performance period may be eligible for tradable Emission Rate Credits (ERCs), zero-emission MWh credits that can be used by affected EGUs to lower their reported CO_2 emissions rate during the plan performance period.
  - EE eligible for ERCs includes measures implemented after 2012 that are achieving MWh savings during the compliance period.
  - Must be grid-connected and tied to a state plan.
  - No interstate discounting of EE impacts required.
- Considerations:
  - ERCs require EM&V for all MWh savings.
  - ERC-issuance and tracking provisions must also be documented in state plans.

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State measures approach

Type of Approach	Role of EE in State Plan	How states can advance EE
State Measures → State Demonstration Based on Mass	***Explicitly included as supporting material for state plan – enforceable under state law; State EE policies and measures can be used to help affected EGUs meet mass goal***	• Implement state EE policies and programs (e.g., EERS, building codes) that are enforceable under state law, either to meet goal or in conjunction with federally enforceable limits • Secure matching allowances from CEIP for low- income EE

- States implement EE programs and requirements (e.g. EERS) to help affected EGUs meet their mass goal – either alone or in conjunction with federally enforceable limits on affected EGUs.
- Considerations:
  - A state measures state plan must include:
    - A projection of EE impacts and EGU CO_2 emission performance,
    - An EM&V plan related to state EE policies and programs as supporting material for the state plan and
    - Federally enforceable backstop emission standards for affected EGUs in the event state measures don't achieve required CO_2 emission reductions.

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Certain CO_2 Reduction Measures Require EM&V

Heat rate improvements
Fuel switching to a lower carbon content fuel
Integration of renewable energy into EGU operations
Combined heat and power
Qualified biomass co-firing and repowering
Renewable energy (new & capacity uprates)
Wind, solar, hydro
Nuclear generation (new & capacity uprates)
*Demand-side EE programs and policies**
Demand-side management measures
Electricity transmission and distribution improvements
Carbon capture and utilization for existing sources
Carbon capture and sequestration for existing sources

EM&V is required for these measures under certain plan circumstances

* Focus of EPA's draft EM&V guidance

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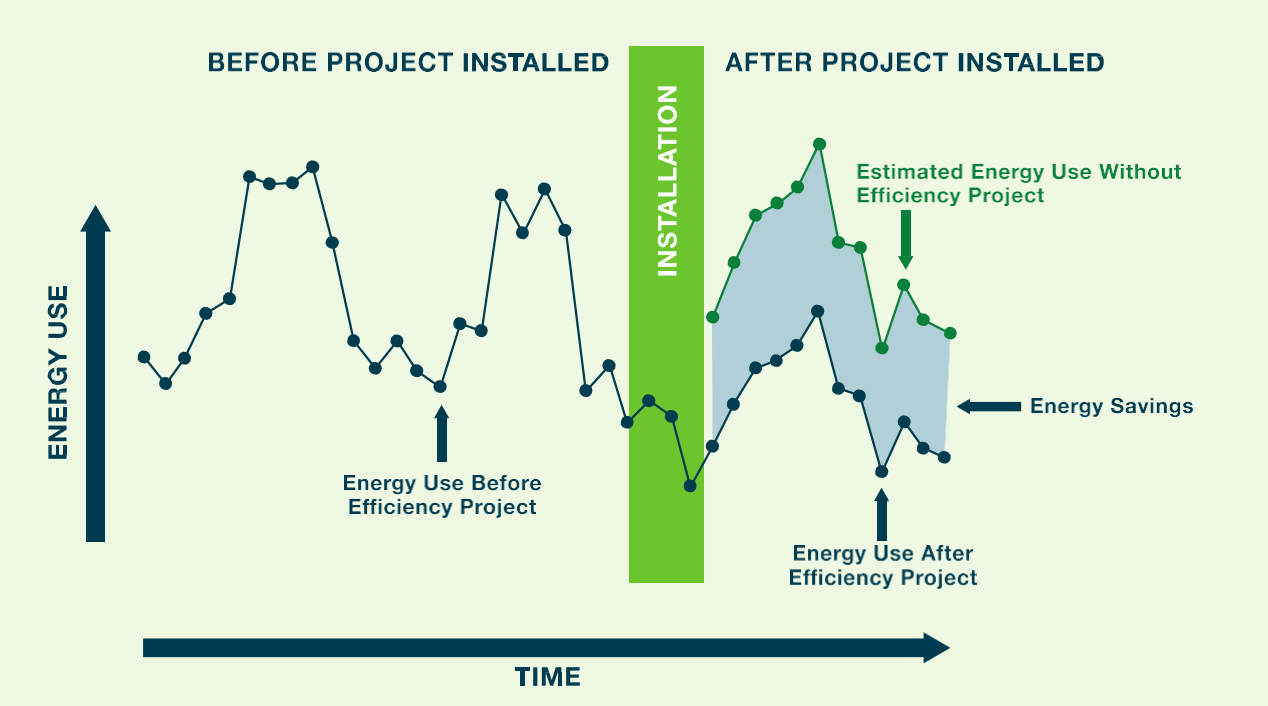
What is EM&V?

- CPP definition for EM&V:

The set of procedures, methods, and analytic approaches used to quantify the MWh from demand-side EE and other eligible resources, and thereby ensure that the resulting savings and generation are quantifiable and verifiable.



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EM&V Content in the CPP

- The **final emission guidelines** include basic requirements to conduct EM&V in certain state-plan circumstances
- **Section VIII.K.3** of Preamble - Discusses best-practice EM&V approaches
- **§ 60.5830** What are the requirements for EM&V plans for eligible resources?
- **§ 60.5805** What is the process for the issuance of ERCs?

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EM&V Plans

- Presumptively approvable EM&V provisions in the **proposed fed plan & model trading rules** support the issuance of emission rate credits (ERCs)
  - Section IV.D.8

- EPA also released **draft EM&V guidance for EE** that supports implementation of the final guidelines and proposed model rule
  - Purpose is to provide supplemental information to help states and EE providers successfully quantify and verify savings
  - Not a regulatory document

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EM&V in the CPP Reflects Existing Best Practices

EM&V for demand-side EE is well-established

- States, EE providers, evaluators, etc. have decades of experience
- Refinements and best practices developed along the way
- Ongoing efforts to improve cross-state consistency and accuracy of results

EPA's approach to the draft EM&V guidance:

- Leverage best practices already in wide use
- Encourage use of existing protocols, methods, tools
- Balance EM&V accuracy with costs and effort
- Anticipate/support the continued evolution of EM&V into the future
- Avoid excessive interference with EM&V practices that are already robust, transparent, and working well

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What's in the Draft EM&V Guidance?

- **Section 1:** Overview and context
- **Section 2:** Discussion and Guidance for 12 Key EM&V Topics, including:
  - EM&V methods
  - Electricity savings metrics and baselines
  - Reporting timeframes and considerations
  - Deemed savings
  - Independent factors
  - Accuracy and reliability of quantified savings
  - Avoiding double counting
  - Effective useful life and persistence
  - Quantification and verification cycles
  - T&D savings adders
  - Interactive effects
  - Use of EE EM&V protocols
- **Section 3:** Additional EM&V guidance for several common EE program and project types, including:
  - Utility/demand-side EE programs (i.e., programs implemented using utility customer funds)
  - Individual EE Projects (e.g., those implemented by ESCOs or at industrial facilities)
  - Building energy codes
  - Appliance standards
- **Appendix A:** Glossary
- **Appendix B:** Templates for EM&V Plans
- **Appendix C:** Considerations for selecting/implementing EM&V methods

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What's Not Included in the Draft Guidance

- Quantification and verification of RE and other zero/low emitting measures
- Criteria for *projecting* the impacts of EE measures
- Process for ERC issuance
- Required components of state trading programs
- Accounting and ERC tracking procedures

These topics are addressed in Section VIII of the final EGs and Section IV of the FP/MR

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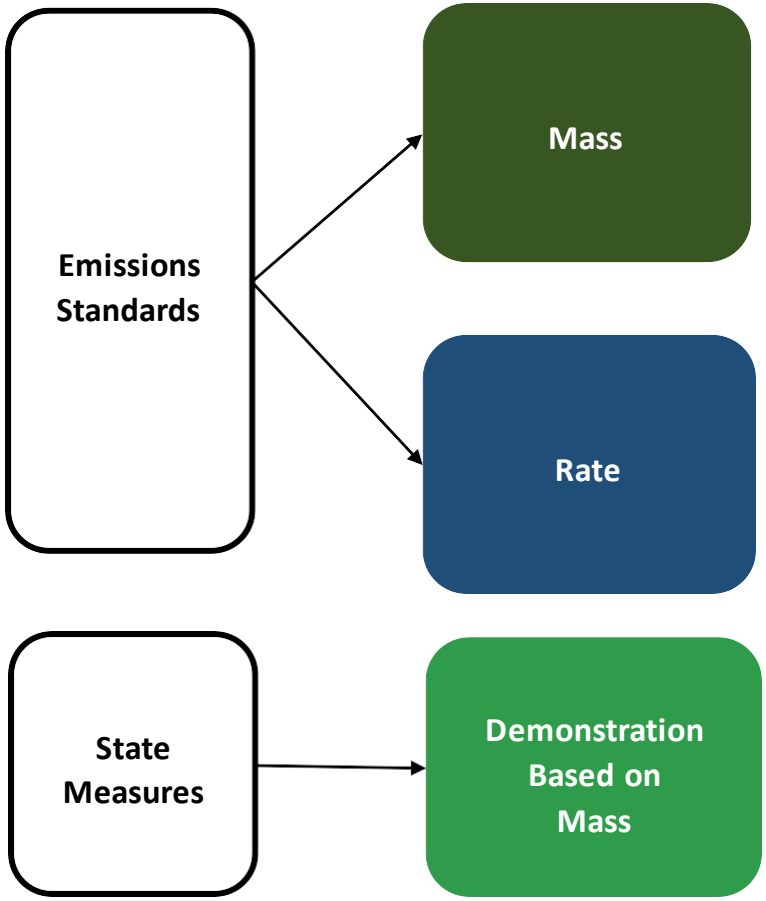
EM&V Required in the CPP



EM&V Requirements

- EM&V is generally not applicable
- EM&V needed for set-asides used to meet the equivalence requirement addressing leakage
- CEIP set asides must have EM&V that meets rate-bsed ERC issuance EM&V requirements
- EM&V plans and reports are needed to support EE/RE ERC tracking, trading, and issuance provisions
- EM&V is needed to secure ERCs in the CEIP for solar, wind and low-income EE
- EM&V is applicable for EE/RE "state measures" (e.g., EERS, building codes); must be documented in supporting material of state plan
- EM&V is needed to secure matching allowances in the CEIP for solar, wind and low- income EE

Note: *State and regional oversight entities typically have purposes, objectives, and authorities for conducting EM&V that are independent of the CPP*

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How Does EE/RE fit in the Clean Power Plan?

Type of Approach		Role of EE/RE in State Plan	How states can advance EE/RE	EM&V Req'd?	Considerations
Emission Standards	Mass	***EE reduces cost, EE/RE lowers CO_2 emissions but are not enforceable or written into the state plan***	• Allocate CO_2 allowances for EE/RE (e.g. through a set aside)	*	• Unlimited flexibility with EE/RE implementation * EM&V generally not required for CPP purposes, except for CEIP and set asides specifically created to meet the leakage requirement
			• Auction allowances, use $ for EE/RE		
			• Secure matching allowances for solar, wind and low-income EE from Clean Energy Incentive Program (CEIP)	✓	
	Rate	***Explicitly written into state plan; Used to generate ERCs and directly adjust reported CO_2 emissions rate of affected EGUs***	• Include EE/RE ERC tracking, trading, and issuance provisions in the state plan	✓	• EM&V plans and M&V reports required • EE/RE is explicitly tracked & credited • Trading-ready plans facilitate broad access to ERCs • EE/RE implemented after 2012 can generate credits starting in 2022
			• Issue ERCs for quantified and verified MWh savings from eligible EE/RE measures	✓	
			• Secure matching ERCs from CEIP for solar, wind, low-income EE	✓	
State Measures	State Demonstration Based on Mass	***Explicitly included as supporting material for state plan – enforceable under state law; State EE/RE policies and measures can be used to help affected EGUs meet mass goal***	• Implement state EE/RE policies and programs (e.g., EERS, RPS, building codes) that are enforceable under state law, either to meet goal or in conjunction with federally enforceable limits	✓*	• Projection of EE/RE impacts required and EGU CO_2 performance required ✓* EM&V Plan for EE/RE measures must be included as supporting material for state plan • Backstop emission standards for affected EGUs if CO_2 reductions don't materialize
			• Secure matching allowances from CEIP for solar, wind and low-income EE	✓	

Information and Resources

After two years of unprecedented outreach, the EPA remains committed to engaging with all stakeholders as states implement the final Clean Power Plan.

- For more information and to access a copy of the rule, visit the **Clean Power Plan website**: http://www2.epa.gov/carbon-pollution-standards
- For a factsheet on Energy Efficiency in the Clean Power Plan, see: http://www2.epa.gov/cleanpowerplan/fact-sheet-energy-efficiency-clean-power-plan
- Through graphics and interactive maps, the **Story Map** presents key information about the final Clean Power Plan. See: http://www2.epa.gov/cleanpowerplan
- For community-specific information and engagement opportunities, see the **Community** Portal: http://www2.epa.gov/cleanpowerplan/clean-power-plan-community-page
- For additional resources to help states develop plans, visit the **CPP Toolbox for States**: http://www2.epa.gov/cleanpowerplantoolbox
- For a graphical and detailed walk through of the EGU category-specific CO_2 emission performance rate and state goals, see **State Goal Visualizer**: http://www2.epa.gov/cleanpowerplantoolbox
- EPA provides **webinars** and **training** on CPP related topics at the air pollution control learning website. See: http://www.apti-learn.net/lms/cpp/plan/
- **Federal programs and activities** to support renewable energy and energy efficiency in low- and moderate-income communities: https://www.whitehouse.gov/sites/default/files/low-income_and_energy_efficiency_programs.pdf
- Federal initiative to **increase solar access** for all Americans: https://www.whitehouse.gov/the-press-office/2015/07/07/fact-sheet-administration-announces-new-initiative-increase-solar-access

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Thank You and Discussion

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Reference Slides for Questions that might arise…

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ERC Geographic Eligibility

Projects originating in:	RE	Requirements	EE/Requirements non-BSER	
Rate-based state	Y	Eligible facility registers in one rate-based state; ERCs issued from that state.	Y	Same as RE.
Mass-based states	Y	Power must be delivered to the grid to meet rate-based state demand	N	
States (incl. Indian country) without affected EGUs	Y	Power must be delivered to the grid to meet rate-based state demand	N for states. Y for Indian Country	Area of Indian Country must be located within the footprint of a rate-based state
Outside the U.S.	Y	Power must be delivered to the grid to meet rate-based state demand	N	
Non-contiguous states and territories with affected EGUs (HI, AK, PR, Guam)	N		N	
Territories without affected EGUs and not connected to regional grid (USVI)	N		N	

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ERC Geographic Eligibility

ERC-eligible measure in rate-based state → Can be issued ERCs by any rate-based state.

- Wind facility in Iowa (rate) can register in and be issued ERCs by any rate-based state.
- Where those ERCs can be traded is a separate matter.

- **RE facility (not EE) in a mass-based state** → Can be issued ERCs by a rate- based state IF
  - generation was delivered to the grid to meet load in a state with a rate-based plan (e.g., power delivery contract or power purchase agreement).

- **RE facility in state or Indian country with no affected EGUs (or other countries)** → Can be issued ERCs by a rate-based state IF
  - generation was delivered to the grid to meet load in a state with a rate-based plan (e.g., power delivery contract or power purchase agreement).

How Does RE fit in the Clean Power Plan?

Type of Approach		Role of RE in State Plan	How states can advance RE
Emission Standards	Mass	RE helps lower CO_2 emissions, but is not federally enforceable or included in the state plan	• Allocate CO_2 allowances for RE (e.g. through a set-aside) • Auction allowances, use proceeds for RE • Secure matching allowances for wind and solar from Clean Energy Incentive Program (CEIP)
Emission Standards	Rate	RE provisions included in state plan; Used to generate Emission Rate Credits (ERCs) that can be used to adjust reported CO_2 emissions rate of affected EGUs	• Include RE ERC tracking, trading, and issuance provisions in the state plan • Issue ERCs for quantified and verified MWh from eligible RE measures • Secure matching ERCs from CEIP for wind and solar
State Measures	State Demonstration Based on Mass	RE included as supporting material for state plan – enforceable under state law; State RE policies and measures can be used to help affected EGUs meet mass CO_2 goal	• Implement state RE policies and programs (e.g., RPS) that are enforceable under state law, either to meet goal or in conjunction with federally enforceable limits • Secure matching allowances from CEIP for wind and solar

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RE EM&V Requirements in the CPP

- § **60.5830(c)(1)**

  "For RE resources, your plan must include requirements discussing how the generation data will be physically measured on a continuous basis using, for example, a revenue-quality meter"

RE EM&V Requirements in the Fed Plan/Model Rule

- **For RE, the FP/MR proposes that generation may be quantified using:**
  - A revenue quality meter that meets the applicable ANSI C–12 standard or equivalent
  - An inverter reading, in cases where RE generators are interconnected behind the customer meter
  - An estimate of generation, where the RE generating facility is 10 kW or less
  - Factors that account for avoided transmission and distribution (T&D) system losses, where generators are behind the customer meter

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